

REMARKS

Claims 1 - 18 are pending in the present Application. Claim 14 has been canceled and Claim 1 has been amended, leaving Claims 1 – 13 and 15 - 18 for consideration upon entry of the present Amendment.

Claim 1 has been amended to incorporate the limitation of “the organic polymer being present in the form of a film. Support for this amendment can at least be found in Paragraph [0035] as originally filed.

No new matter has been introduced by these amendments or new claims. Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Elections/Restrictions

The Examiner has required a restriction of the invention under 35 U.S.C. 121 into two groups as follows:

I. Claims 1 – 18, drawn to a method of exposing a resorcinol arylate polyester to light having a wavelength of 290-400 nanometers at a power of 1 – 20 mW/cm², classified in class 430, subclass 269.

II. Claims 19 – 23, drawn to imaged articles in resorcinol arylate polyesters, classified in class 430, subclass 9.

Applicants hereby confirm that in a telephonic conversation with the Examiner on March 16, 2006, a provisional election was made to prosecute the invention of group I, claims 1 – 18.

Claim Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 1-18 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. (Office Action dated 03/31/06, page 2)

Applicants have currently amended Claim 1 to recite the limitations found in at least paragraph [0035]. The rejection is therefore rendered moot. Reconsideration and withdrawal of this rejection are respectfully requested.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-7, 10, 11, 13, 14 and 16-18 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 5,916,997 to Webb et al. (hereinafter Webb) Claims 1-8, 10, 11, 13, 14 and 16-18 stand rejected under 35 U.S.C. § 102(e), as allegedly anticipated by U.S. Patent No. 6,559,270 to Siclovan et al. (hereinafter Siclovan) Claims 1-8, 10-14 and 16-18 stand rejected under 35 U.S.C. § 102(e), as allegedly anticipated by U.S. Patent No. 6,417,253 to Shakhnovich, Claims 1-7, 9-14 and 16-18 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by Cohen et al. "Transparent ultraviolet-barrier coatings", J. Polymer Sci. Pt A-1 Vol. 9 pp. 3263-3299 (1971). (hereinafter Cohen) (Office Action dated 03/31/2006, pages 4 - 5) Applicants respectfully traverse this rejection.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

The invention as presently amended is directed to a method for manufacturing data storage media comprising irradiating at least a portion of an organic polymer comprising a resorcinol arylate polyester with a UV beam having a wavelength of about 290 to about 400 nanometers so as to impart an energy of about 1 to about 20 milliwatt/square centimeter to the irradiated portion of the organic polymer, wherein the irradiation produces a difference in refractive index of about 0.0001 to about 0.1 between an irradiated portion and an unirradiated portion of the organic polymer. (Claim 1)

Webb teaches weatherable polyester soft block copolymer compositions comprising copolymers of resorcinol. (See Abstract) Webb in its examples, subjects samples to irradiation from a Xenon arc Weatherometer[®]. (Col. 7, lines 11 – 13) The irradiance was 0.77 Watts per square meter at 340 nanometers. (Col. 7, lines 13 – 15) Webb does not teach selectively irradiating portions of the polyester block copolymer. Irradiating the entire polymer surface without protecting certain portions of the surface (by using a mask) will result in the entire surface undergoing a Fries rearrangement and forming a weatherable polymer (as explained in the reference by Cohen). Webb therefore does not teach a method that would result in a holographic data storage.

In the first instance, the irradiance of 0.77 Watts per square meter is 0.077 milliwatts/square centimeter, which lies outside the claimed range of about 1 to about 20

milliwatts/square centimeter. In addition, Webb does not teach a difference in refractive index of about 0.0001 to about 0.1 between an irradiated portion and an unirradiated portion of the organic polymer. Since Webb does not selectively irradiate portions of the polymer, irradiating the resorcinol arylate polyesters in the manner prescribed by Webb would not result in the claimed refractive index difference. For these reasons at least, Webb does not teach all elements of the claimed invention and therefore cannot anticipate the claimed invention. Applicant's respectfully request a withdrawal of the § 102 rejection over Webb and an allowance of the claims.

Siclovan teaches the preparation of block copolyestercarbonates. (see Abstract) Like, Webb, Siclovan in its examples, subjects samples to irradiation from a Xenon arc Weatherometer[®]. (Col. 24, lines 40 – 43) The irradiance was 0.77 Watts per square meter at 340 nanometers. (Col. 24, lines 43 – 45) Siclovan, like Webb, does not teach selectively irradiating portions of the polyester block copolymer.

As noted above, the irradiance of 0.77 Watts per square meter is 0.077 milliwatts/square centimeter and lies outside the claimed range of about 1 to about 20 milliwatts/square centimeter. In addition, Siclovan's method of irradiating the polymer would not produce a difference in refractive index of about 0.0001 to about 0.1 between an irradiated portion and an unirradiated portion of the organic polymer. For these reasons at least, Siclovan does not teach all elements of the claimed invention and therefore cannot anticipate the claimed invention. Applicant's respectfully request a withdrawal of the § 102 rejection over Siclovan and an allowance of the claims.

Shakhnovich teaches color stability of thermoplastic polymers. (see Abstract) Shakhnovich, like Webb and Siclovan teaches an irradiance of 0.77 Watts per square meter at 340 nanometers. (Col. 14, lines 24 – 26) As noted above, the irradiance of 0.77 Watts per square meter is 0.077 milliwatts/square centimeter and lies outside the claimed range of about 1 to about 20 milliwatts/square centimeter.

Shakhnovich does not teach irradiating the polymer in a manner that would produce a refractive index difference between the irradiated portions and the non-irradiated portions. As a result, Shakhnovich does not teach a difference in refractive index of about 0.0001 to about 0.1 between an irradiated portion and an unirradiated portion of the organic polymer. For these

reasons at least, Shakhnovich does not teach all elements of the claimed invention and therefore cannot anticipate the claimed invention. Applicant's respectfully request a withdrawal of the § 102 rejection over Shakhnovich and an allowance of the claims.

Cohen teaches transparent Ultraviolet Barrier coatings. (see Title) Cohen teaches irradiating samples with low intensity exposures having an irradiance of 0.71 mW/cm^2 and with high intensity exposures having an irradiance of 13 mW/cm^2 . (Page 3265) Cohen teaches that the irradiation is used to create a skin which prevents the further penetration of UV light into the film. (see Synopsis on page 3262) Since the skin is formed over the entire upper surface of the film, Cohen cannot produce a difference in refractive index of about 0.0001 to about 0.1 between an irradiated portion and an unirradiated portion of the organic polymer. For these reasons at least, Cohen does not teach all elements of the claimed invention and therefore cannot anticipate the claimed invention. Applicant's respectfully request a withdrawal of the § 102 rejection over Cohen and an allowance of the claims.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-18 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over U.S. Patent No. 5,128,223 to Gillberg-LaForce et al. (hereinafter Gillberg) in view of Cohen. (Office Action dated 03/31/2006, page 6) Applicants respectfully traverse this rejection.

In making the rejection, the Examiner has stated that "it would have been obvious to one skilled in the art to modify the teachings of Gillberg by using other materials known to undergo Fries rearrangements under the influence of low intensity UV exposure such as the resorcinol polyesters disclosed by Cohen." (Office Action dated 03/31/2006, page 6)

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5

U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Gillberg teaches a process for preparing a holographic composition which is a thin film of polyphenyl acylate polymer which has a photo-Fries molecular rearrangement corresponding to a recorded refractive index pattern induced by exposure to a coherent light interference pattern. (see Abstract) Gillberg teaches that irradiation of the polyphenyl acylate polymer produces a refractive index pattern modulation in the range of 0.00 to 0.05 (Col. 3, lines 60 – 62) Gillberg however does not teach irradiating a resorcinol arylate polyester as presently claimed.

Cohen teaches irradiating a number of phenyl polyesters. (see Synopsis) Cohen teaches that the photochemical Fries rearrangement produces ultraviolet opacity in the irradiated film while maintaining visual transparency. *Id.* Cohen further teaches that spectroscopic analysis shows the formation of a skin that protects the original polyester coating as well as the coated substrate upon which the polyester coating is disposed. *Id.*

In the first instance, there is no motivation to combine Gillberg with Cohen. Gillberg is interested in the forming of a holographic structure in a polyphenyl acylate polymer. In order to produce a holographic structure, there must be a visible difference in refractive index between the irradiated portions of the polymer and the non-irradiated portions. Cohen on the other hand desires to form a uniform protective skin on the surface of a polyester. The formation of a uniform protective skin obviates the need for a difference in refractive index between different portions of the polymer. The teachings of Cohen are thus incompatible with the teachings of Gillberg. Cohen, in teaching a protective coating essentially teaches away from Gillberg's teachings of refractive index differences between different parts of the polymer film. Thus one of ordinary skill in the art upon reading the mutually exclusive teachings of Cohen and Gillberg would not have sought to combine these references in the manner made by the Examiner.

Since Gillberg teaches away from Cohen, one of ordinary skill in the art would not have selectively replaced the polyphenyl acylate polymer of Gillberg with the polyesters of Cohen.

In addition, there is no expectation of success. As noted above, Gillberg teaches using irradiation to produce holographic structures in polyphenyl acylate polymers. The holographic structures are produced by using a mask during the irradiation. (see Example 1; Col. 5, line 10 – Col. 6, line 23) The mask shields certain areas of the polymer from irradiation. The areas that are

protected by the mask do not get irradiated and consequently do not undergo any Fries rearrangement. The unprotected areas undergo a Fries rearrangement which leads to differences in refractive index between the irradiated and the unirradiated areas. The refractive index difference produces the holographic structure in the film. Thus, from Gillberg, one of ordinary skill in the art would require the use of a mask to bring about the refractive index differences that result in the holographic structure. In addition, the polymer would have to be one where, upon irradiation, the reaction did not proceed to unprotected areas (areas not covered by the mask) of the polymer.

Cohen, on the other hand, irradiates phenyl polyesters across their entire surface in order to produce a uniform change in structure across the entire surface. The uniform change across the surface produces a weatherable polymer that protects the unexposed polymer that lies below the surface as well as the substrate upon which the polymer is disposed. Cohen does not teach using a mask to isolate the surface of the polymer from radiation. One of ordinary skill in the art upon reading Cohen (or Webb or Siclovan for that matter) would not be appraised of whether the use of a mask would protect the unirradiated portions of the polymer from undergoing a Fries rearrangement. Indeed, since this fact is not taught by Cohen, it is quite plausible that the entire resorcinol arylate polyester film upon being subjected to the slightest amount of irradiation could undergo a complete change in refractive index across the entire volume of material, not just in the exposed areas. The fact that the resorcinol arylate polyester undergoes a change in refractive index only in those portions that are irradiated (as opposed to those portions that are not irradiated) is not disclosed in either Gillberg (since it is directed to polyphenyl acylate) or Cohen (or Webb or Siclovan). One of ordinary skill in the art would therefore not have expected a difference in the refractive index of resorcinol arylate polyesters upon selective irradiation (i.e., using a mask) since it is neither taught nor suggested by Gillberg or Cohen. The results shown in the Examples of the present application therefore demonstrate success in manufacturing a holographic data storage where none could have been expected from reading either Gillberg or Cohen.

In summary, since there is no motivation to combine Gillberg with Cohen, and since there is no expectation of success, Applicants respectfully request a withdrawal of the obviousness rejection and an allowance of the claims.

Claims 1-18 stand rejected under 35 U.S.C. § 103(a), as allegedly being unpatentable over Gillberg in view of either Webb or Siclovan combined with Cohen. (Office Action dated 03/31/2006, page 7) Applicants respectfully traverse this rejection.

As noted above, neither Webb or Siclovan teach irradiating the polymer in a manner that would produce a difference a refractive index. Webb and Siclovan are both directed to weatherable polymers. (see Abstracts of both references) The methods disclosed by Webb and Siclovan, like that disclosed by Cohen, teach away from the method of Gillberg, which is focused on creating differences in refractive index between the irradiated and unirradiated portions of the polymer.

In order to produce a weatherable polymer, the entire surface of the polyester polymer must be irradiated, while in order to produce holographic data storage only portions of the polymer are to be irradiated. One of ordinary skill in the art would not have sought out the references by Webb and Siclovan and combined them with Gillberg since the method disclosed by Webb and Siclovan would exclude the method disclosed by Gillberg. There would therefore be no motivation to combine Webb and Siclovan with Gillberg.

Cohen, like Webb and Siclovan also teaches irradiating a polyester polymer in order to convert it into a weatherable polymer. As noted above, there is no motivation to combine Cohen with Gillberg in view of Webb or Siclovan as contended by the Examiner.

In addition, as noted above, one of ordinary skill in the art upon reading Cohen, Webb or Siclovan would not be appraised of the fact that resorcinol aryl polyesters can only undergo refractive index changes in those portions that are irradiated. As explained above, selective substitution of the resorcinol arylate polyesters of Webb, Siclovan or Cohen for the polyphenyl acylate of Gillberg, provides no guarantee of success either. None of the aforementioned reference disclose that resorcinol aryl polyesters can be selectively irradiated to produce refractive index differences between irradiated and unirradiated portions. For these reasons at least, Applicants believe that the Examiner has not made a prima facie case of obviousness over Gillberg in view of either Webb or Siclovan combined with Cohen. Applicants respectfully request a withdrawal of the obviousness rejection and an allowance of the claims.

Claims 1-18 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Gillberg in view of Cohen, and further in view of JP 63-287986 to Kuwayama et al. (hereinafter Kuwayama) (Office Action dated 03/31/2006, page 7)

Kuwayama teaches deterioration by UV light. (see Abstract) It teaches obtaining a hologram that does not yellow over a long period of time by providing a layer having UV light absorbtivity in an optical path to a hologram grating. (see Abstract) Kuwayama does not however compensate for or rectify the disparate teachings between Gillberg on the one hand and Cohen, Webb or Siclovan on the other. For these reasons at least, Applicants believe that the Examiner has not made a prima facie case of obviousness over Gillberg in view of Cohen and further in view of Kuwayama. Applicants respectfully request a withdrawal of the obviousness rejection and an allowance of the claims.

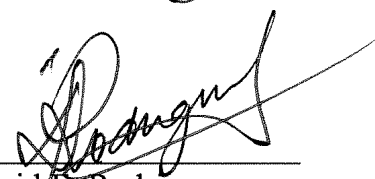
It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and withdrawal of the objection(s) and rejection(s) and allowance of the case are respectfully requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN LLP

By



David E. Rodrigues

Registration No. 50,604

Date: August 30, 2006
CANTOR COLBURN LLP
55 Griffin Road South
Bloomfield, CT 06002
Telephone (860) 286-2929
Facsimile (860) 286-0115
Customer No.: 23413